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FARMERS' PESTICIDE EXPENDITURES FOR CROPS, LIVESTOCK, AND OTHER SELECTED USES IN 1964

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AGRICULTURAL ECONOMIC REPORT NO. 145

ECONOMIC RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE

PREFACE

In 1964, Congress authorized an expanded program of research on the use of pesticides in agriculture. One phase of this program was a periodic farm survey to obtain information about the use of pesticides in different areas and on different crops and classes of livestock. These data would provide a basis for estimating the costs and benefits of pesticides and would serve as a measure of changes in pesticide use.

To meet this need for information, the Economic Research Service (ERS) undertook a nationwide sample survey of farmers in early 1965 to measure the extent of pesticide use by farmers during 1964. Personnel in the Statistical Reporting Service (SRS), Agricultural Research Service (ARS), and the Agricultural Stabilization and Conservation Service (ASCS) assisted in carrying out the study.

This report is on the first national survey of farmers' expenditures for pesticides. Although publication was delayed because of problems in computer compilations, the data will serve as important benchmarks.

The Standards and Research Division of SRS designed the nationwide sample from which farmers were selected for interview. The Data Collection Branch of SRS assisted in developing the final format of the questionnaire and supervised the collection of data through their State statistics offices throughout the country. The Washington Data Processing Center of SRS developed the automatic data processing system and program specifications and provided technical assistance in editing and tabulating the data.

Personnel in the Crops Research, Entomology Research, and Pesticide Regulation Divisions of ARS and the Defense Activities Staff of ASCS assisted in designing the questionnaire and provided technical information related to pesticides.

Special acknowledgment is made to Velmar W. Davis, Chief, Production Resources Branch, Farm Production Economics Division, ERS, for his work in initiating the pesticide research program and in developing the benchmark survey on which this report is based. The authors are also indebted to the thousands of farmers who voluntarily provided the data collected in the ERS pesticide and general farm survey.

Other reports based on the 1964 survey are Farmers' Expenditures for Pesticides in 1964 (Agr. Econ. Rpt. No. 106, Jan. 1967), Quantities of Pesticides Used by Farmers in 1964 (Agr. Econ. Rpt. No. 131, Jan. 1968), and Farmers' Expenditures for Custom Pesticide Service in 1964 (Agr. Econ. Rpt. No. 146, Oct. 1968).

A later series, based on a 1966 survey of pesticide use, is underway. The first of these reports is entitled Extent of Farm Pesticide Use on Crops in 1966 (Agr. Econ. Rpt. No. 147, Oct. 1968).

CONTENTS

	<u>Page</u>
Summary-----	v
Methodology-----	1
Farmers' Expenditures for Pesticides-----	2
Crop Pesticides-----	2
Expenditures by Regions-----	4
Expenditures by Form of Application-----	5
Expenditures by Size of Farm-----	6
Livestock Pesticides-----	7
Expenditures by Regions-----	9
Expenditures by Form of Application-----	10
Pesticides for Other Uses-----	10
Appendix Tables-----	13

SUMMARY

Approximately 94 percent of all farmers in the United States used pesticides in 1964. For pesticide materials alone, farmers spent an estimated \$479 million--\$424 million for crops, \$31 million for livestock, \$17 million for treatment of land not in crop production, and \$7 million for rodent control. This is a revision of the previously reported total of \$514 million and is based on a more detailed expansion of the sample data. (See footnote 3, p. 2.)

In 1964, \$114 million was spent for pesticides used on cotton, more than for any other crop. Over 90 percent of the total acreages in apples, other deciduous fruits, and tobacco were treated. Among all crops, costs for pesticide materials ranged from an average of 56 cents an acre for wheat to \$53.40 an acre for apples. Almost 60 percent of the acreage in corn--the most widely grown crop in the United States--was treated at an average cost of \$1.87 an acre. Fruits and vegetables were more likely to be treated than were field crops, the survey showed.

Costs per acre for pesticide materials varied considerably among farm production regions as well as among crops. For example, on a relatively few thousand acres of tobacco grown in the Lake States, principally in Wisconsin, pesticide costs averaged only \$1.22 an acre in 1964. But, in the Southeast, pesticide costs for tobacco were almost \$40 an acre. Many factors influence farm expenditures for pesticides. Among the more important are climate, substitution of pesticides for other resources, and development of new pesticides to treat old pests.

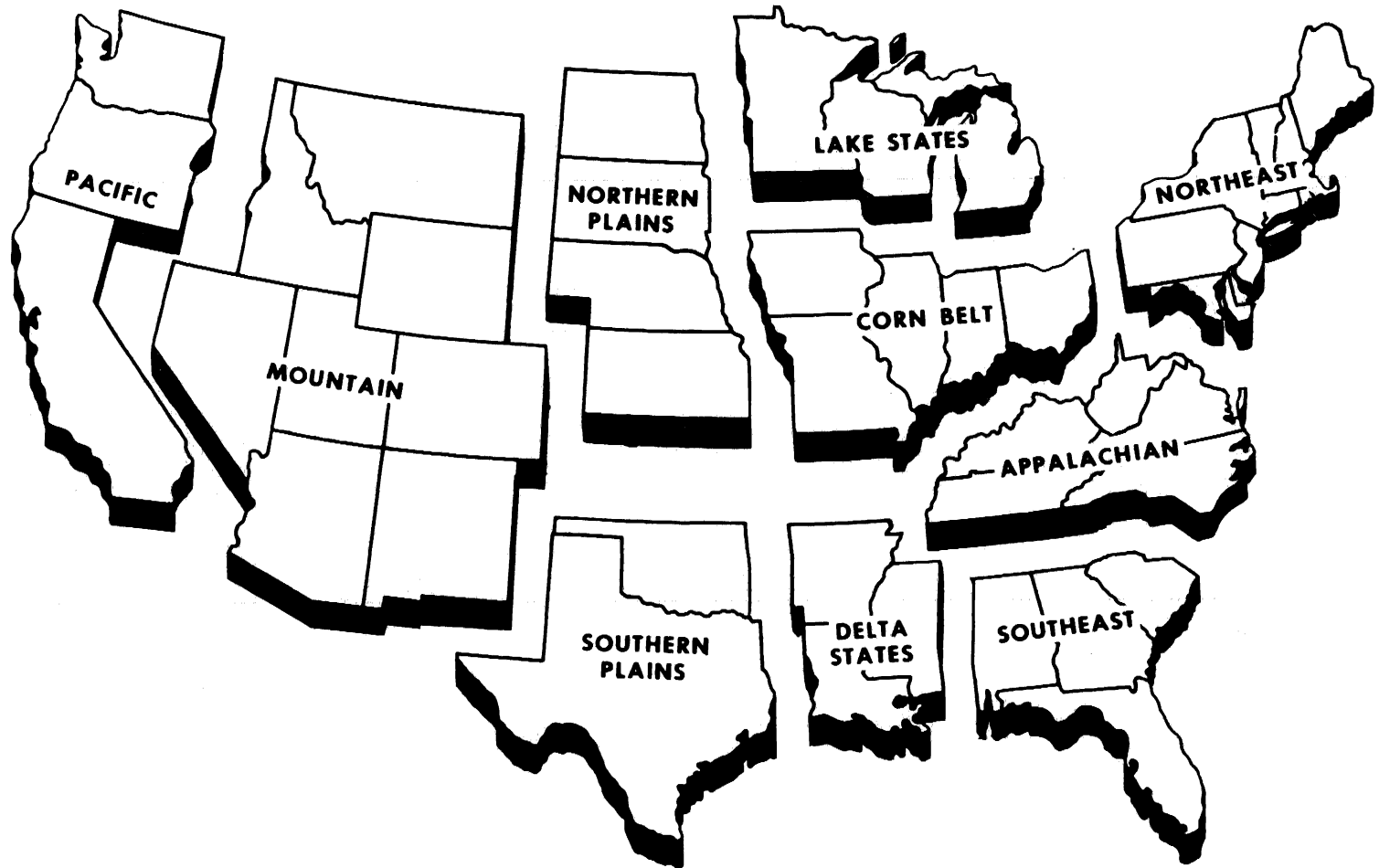
Most pesticides are applied to crops as sprays in oil or water solutions, as dry dusts, or as granules. Sprays accounted for 75 percent of total expenditures for pesticides applied to crops.

Farmers with gross sales of \$40,000 or more accounted for 40 percent of all pesticide expenditures. Pesticide costs per acre tended to average lowest for farms in the intermediate-size class (gross annual sales between \$10,000 and \$20,000).

Pesticides for treatment of livestock accounted for 6.5 percent--\$31.3 million--of total pesticide expenditures in 1964. Over half of this amount--\$17.7 million--was spent to treat beef cattle. At the regional level, total costs for treatment of all livestock were highest in the Corn Belt and lowest in the Southeast. Almost three-fourths of all farmers with livestock used pesticides to treat animals sometime during 1964. As with crop treatments, spray materials accounted for well over half the total outlays for livestock pesticides.

Costs of materials used for crops and livestock took 95 cents of every dollar spent by farmers for pesticides in 1964. The remaining 5 cents went for rodent control and for miscellaneous purposes associated with farmland not used for crop production.

FARM PRODUCTION REGIONS



U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 1399A-62 (8) ECONOMIC RESEARCH SERVICE

Figure 1

FARMERS' PESTICIDE EXPENDITURES FOR CROPS, LIVESTOCK, AND OTHER SELECTED USES IN 1964

by

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This is another in a series of reports based on a nationwide enumerative survey of farm pesticide use in 1964 by the Economic Research Service, U.S. Department of Agriculture. It contains revised estimates of expenditures and more detailed information than the initial report.^{1/} Data on pesticides in these reports do not include materials used in organized local, State, and Federal pest control programs. Also excluded are disinfectants and any kind of medicine taken internally by livestock. Pesticides are grouped according to their major use: (1) herbicides (chemicals used to kill or inhibit the growth of plants), (2) insecticides (chemicals used to kill or inhibit insects), and (3) fungicides (chemicals used to kill or inhibit fungi). Also included are fumigants (gaseous chemicals used to treat soils and stored products), defoliants and desiccants (chemicals used as harvesting aids), growth regulators (chemicals used to influence plant growth processes), and miticides (chemicals used to kill mites).

METHODOLOGY

Findings are based on a survey of 10,800 farmers in 417 counties throughout the 48 contiguous States. Farmers were selected for interview on the basis of a stratified random sample. This sample was designed to represent larger commercial farms, which accounted for 90 percent of the sales of farm products. The survey included farmers with annual gross sales of \$5,000 or more in all ERS production regions other than in the Appalachian, Southeast, and Delta States regions. In these three regions, farmers reporting gross sales of \$2,500 or more were included. The States in each production region are shown in figure 1. Nearly 1 percent of all farms in the classes described above were included in the sample.

The sample data for crops were expanded to 1964 Census of Agriculture totals for each region on the basis of acres of each crop grown on the sample farms relative to total production of the crop in the region. For example, the 247,700 acres of corn reported grown by sample farmers in the Corn Belt were expanded to 31,125,000 acres of corn grown by all farmers in the Corn Belt in 1964 as reported in the Census of Agriculture. It is assumed that the smaller farms not included in the sample used pesticides at the same rates as the farms that were sampled and that the data in the report apply to all farms in the region.

^{1/} Andrienas, Paul; Eichers, Theodore; and Fox, Austin; Farmers' Expenditures for Pesticides in 1964. U.S. Dept. Agr., Econ. Res. Serv., Agr. Econ. Rpt. No. 106, Jan. 1967.

Livestock data were expanded in a similar way. In each region, the total number of commercial farms reporting a class of livestock (based on the 1964 Census of Agriculture) was divided by the number of sample farms in the region reporting that class of livestock. This ratio of total farms with livestock to sample farms was used to expand the sample data to the total population of the region. Data on use of "other pesticides" were expanded on the basis of average crop expansion factors for each region.

Each of 17 classes of crops, five classes of livestock, and two categories of other usage had a separate expansion factor for the 10 designated regions.^{2/} Regional totals were added to obtain U.S. totals for each class of crops, livestock, or other usage.

FARMERS' EXPENDITURES FOR PESTICIDES

Expenditures for pesticides are a significant part of the cost of farming in the United States. This analysis indicates that about 94 percent of all farmers paid an estimated \$479 million^{3/} for pesticides for major uses (table 1). This excludes pesticides used for treating seeds, stored crops, and storage buildings as well as disinfectants and any kind of medicine taken internally by livestock. Costs of pesticides for uses associated with crop production were nearly \$424 million, or 88 percent of the total. The remaining 12 percent--\$55 million--was spent for pesticides used to treat livestock, including poultry, for rodent control, and for other noncropland uses.

Crop Pesticides

Pesticides were used for treatment of crops or cropland on about 73 percent of all farms. The percentage ranged from a low of 7 percent for hay producers to 96 percent for growers of citrus fruit. Fruit and vegetable producers were among the heaviest users of pesticides (table 2). High percentages of cotton and tobacco growers also reported relatively large expenditures for pesticides.

In 1964, farmers spent \$114 million for pesticides used on cotton, more than for any other single crop. Treatment of cotton can be a season-long undertaking. Many growers use pesticides to eliminate weeds at planting time, to control insects during the growing season, and to defoliate plants at harvesttime when mechanical cotton pickers are used. Pesticide expenditures for cotton averaged \$11.27 per planted acre treated.^{4/}

^{2/} See appendix table 27 for a listing of crops included in grouped categories.

^{3/} This figure differs from the estimate of \$514 million reported in Agr. Econ. Rpt. No. 106, cited on p. 1. It is considered a more accurate estimate because the sample data herein have been expanded by crop acres and livestock numbers rather than by enumeration of farms as in the earlier publication. Even though the estimate of total expenditures is revised, the relationships shown previously are still valid.

^{4/} Unless otherwise indicated, costs of applying pesticides are excluded in this report. The expenditures data shown are for pesticide materials only.

Table 1.--Total value of farm pesticide expenditures and distribution by major uses, by production region, 48 contiguous States, 1964 1/

Region	Crop treatment	Livestock and poultry treatment <u>2/</u>	Rodent control	Noncropland treatment	Total pesticide expenditures
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Northeast-----	29,820	2,503	727	131	33,181
Lake States-----	28,104	3,632	863	1,266	33,865
Corn Belt-----	58,834	7,106	1,790	3,092	70,822
Northern Plains-----	16,345	2,654	914	1,348	21,261
Appalachian-----	48,450	1,887	637	796	51,770
Southeast-----	63,089	870	305	689	64,953
Delta States-----	47,977	1,192	557	424	50,150
Southern Plains-----	39,692	5,852	497	693	46,734
Mountain-----	17,031	4,467	250	4,382	26,130
Pacific-----	74,319	1,130	768	3,941	80,158
United States-----	423,661	31,293	7,308	16,762	479,024

1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.

2/ Includes pesticides used for treating cattle, sheep, hogs, poultry, and the buildings which house these animals. Does not include disinfectants or any kind of medicine taken internally.

Table 2.--Extent and cost of pesticides used on specified crops, all farms, 48 contiguous States, 1964 1/

Crops	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	73	69	114,040	11.27
Corn-----	56	59	71,803	1.87
Wheat-----	20	28	9,487	.56
Sorghum-----	26	22	2,682	.69
Other grains <u>3/</u> -----	18	27	19,796	1.60
Tobacco-----	94	93	30,025	30.58
Soybeans-----	19	24	18,352	2.41
Other field crops <u>3/</u> -----	44	39	20,047	4.52
Alfalfa-----	7	6	4,023	2.21
Other hay and pasture <u>3/</u> -----	7	1	6,510	.86
Irish potatoes-----	85	84	10,691	10.74
Other vegetables <u>3/</u> -----	64	81	33,368	13.42
Citrus-----	96	89	13,785	12.74
Apples-----	89	97	38,968	53.40
Other deciduous fruits <u>3/</u> -----	95	97	14,610	21.21
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	80	86	12,097	9.09
Summer fallow-----	13	3	3,377	1.42
All crops (not including other hay and pasture)-----	---	38	417,151	4.05
All crops (including other hay and pasture)-----	73	10	423,661	3.89

1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.

2/ Farms using pesticides on specified crops as a percentage of farms growing these crops.

3/ Crops included in this category are listed in appendix table 27.

Corn, which is produced commercially in all 48 contiguous States, is the most widely distributed farm crop next to hay. On 56 percent of the farms where corn was grown in 1964, pesticides were used at one or more stages of the production cycle. Principal uses of corn pesticides are to control weeds, thereby reducing the need for some mechanical cultivation, and to control insects. For the conterminous United States, expenditures for corn pesticides averaged \$1.87 per planted acre treated and totaled \$71.8 million.

Highest costs per acre for crop pesticides were reported by apple growers. Nine out of 10 growers treated their orchards at an average pesticide cost of \$53.40 an acre. For typical plantings of 30 to 40 trees per acre, this amounts to considerably less than \$2 a tree.

Products intended primarily for direct human consumption--fruits and vegetables--were far more likely to be treated with pesticides than were most field crops, with the important exception of tobacco and cotton. Costs per acre also tended to be markedly higher for fruits and vegetables. For example, 95 percent of the growers of deciduous fruits, other than apples, treated 97 percent of their planted acres at a cost of \$21.21 an acre. In comparison, only 18 percent of the growers of small grain (other than wheat) treated 27 percent of their planted acres at an average cost of \$1.60 an acre. In the aggregate, growers spent nearly \$124 million to treat fruits, vegetables, and a relatively minor acreage of ornamentals with pesticides.

Expenditures by Regions

Pesticide costs per acre tended to vary widely at the regional level. Corn growers in the Delta States reported spending an average of 97 cents per planted acre treated (table 3). On the other hand, growers in the Northeast spent nearly three times as much on corn--\$2.82 an acre. Costs for treating cotton ranged from an average of \$6.36 an acre in the cotton-growing sections of the Corn Belt to \$21.80 an acre in the Pacific region. Greatest differences among major crops were reported by tobacco growers. On a relatively few thousand acres of tobacco grown in the Lake States, principally in Wisconsin, pesticide costs averaged only \$1.22 an acre in 1964. But in the Southeast, pesticide costs for tobacco reached almost \$40 an acre.

Although prices for materials may differ somewhat among retail outlets, the wide range of expenditures reported in the survey probably were generated mainly by causes other than competition for business. Among more fundamental variables are: (1) climatic conditions that either discourage or favor a pest or host plant in one region but not in another; (2) substitution of a pesticide for a farm task that formerly required extensive use of more costly labor and machinery; (3) differences among regions in types of pests to be controlled; (4) invasion of one part of the country by a pest that appears in cycles; (5) introduction of a pest entirely new to a particular area; and (6) development of a new pesticide specific for an old pest.

Detailed information on pesticide expenditures by crops and by planted acre for each farm production region is shown in appendix tables 12-21.

Table 3.--Pesticide expenditures for selected crops, by region,
48 contiguous States, 1964 ^{1/}

Region	Expenditure per acre treated					
	Corn	Cotton	Apples	Vegetables	Tobacco	Soybeans
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Northeast-----	2.82	---	45.20	11.05	26.41	2.49
Lake States-----	2.16	---	50.26	6.13	1.22	4.39
Corn Belt-----	1.67	6.36	67.93	11.07	7.97	3.03
Northern Plains----	1.77	---	---	---	---	2.99
Appalachian-----	2.76	6.37	66.21	4.06	29.42	1.16
Southeast-----	2.07	13.75	---	16.34	38.91	2.70
Delta States-----	.97	14.09	29.42	3.88	---	1.85
Southern Plains----	1.20	7.35	---	16.86	---	1.20
Mountain-----	1.54	11.81	30.41	14.91	---	---
Pacific-----	2.78	21.80	61.52	16.51	---	---
United States-----	1.87	11.27	53.40	13.42	30.58	2.41

^{1/} Excludes pesticides used for treating seeds, stored crops, or storage buildings.

Expenditures by Form of Application

Responses to the survey revealed that farmers applied pesticides to crops or cropland as a spray far more frequently than in any other form. Nationally, spray materials accounted for 75 percent of farm expenditures for pesticides, dusts 14 percent, granular materials 9 percent, and "other" 2 percent (table 4).

The physical form in which pesticides are applied is largely determined by economic, technical, legal, agronomic, and safety considerations. Generally, liquids (sprays) have an advantage over dusts. Spray materials can be shipped and handled in concentrated strengths; dilution to field strength, generally with water and sometimes with liquid fertilizer or oil, can be accomplished at the point of application. On the other hand, dusts and granules generally are shipped at field strength. Accordingly, handling and freight costs tend to be higher than for sprays.

When ground equipment is utilized, sprays are usually applied at low pressures. The relatively large droplets thus formed are not easily blown by wind. Under these conditions, sprays are less likely than dusts to drift into adjacent fields.

Recent technical advances include the application of dry pesticides in granular form and the application of liquid materials at technical, or concentrated, strengths. Granules can be made to release their pesticidal content over a much longer period of time than other forms. Also, because granules are heavier than sprays or dusts they tend to lodge in joints where leaves meet the plant's stalk. It is in such natural pockets that some insects tend to develop. A supply of pesticide in such a cache provides good control of certain pests.

Some liquid pesticides are now being applied to crops at full, or nearly full, strength. This means distributing materials at rates as low

Table 4.--Percentage distribution of pesticides by form of application, by crop,
48 contiguous States, 1964 ^{1/}

Crop	Form of application			
	Dust	Granular	Spray	Other
	Percent	Percent	Percent	Percent
Cotton-----	22	1	77	---
Corn-----	7	34	59	---
Wheat-----	2	---	98	---
Sorghum-----	4	2	94	---
Other grains ^{2/} -----	1	2	97	^{3/}
Tobacco-----	15	7	54	24
Soybeans-----	12	29	59	---
Other field crops ^{2/} -----	29	9	61	1
Alfalfa-----	2	4	75	19
Other hay and pasture ^{2/} -----	4	^{3/}	95	1
Irish potatoes ^{2/} -----	21	3	75	1
Other vegetables ^{2/} -----	20	2	75	3
Citrus-----	4	---	95	1
Apples-----	4	---	96	---
Other deciduous fruits ^{2/} -----	10	---	90	---
Other fruits, nuts, berries, nursery, and ornamentals-----	27	^{3/}	73	---
Summer fallow-----	1	5	94	---
All crops-----	14	9	75	2

^{1/} Excludes pesticides used for treating seeds, stored crops, or storage buildings.

^{2/} Crops included in this category are listed in appendix table 27.

^{3/} Less than 0.5 percent.

as a few ounces per acre compared with the gallons of diluted material required previously. As of July 1968 only eight pesticides had received Federal registration for application to crops as ULV (ultra-low-volume) pesticides. Further advances in this area are likely in the future.

Expenditures by Size of Farm

Sample data by farm production regions were expanded and distributed among five groups of farms classified by gross sales of agricultural products. Classification was virtually the same as that used by the Bureau of the Census for the 1964 Census of Agriculture except that "part-time" farms and "part-retirement" farms were included with commercial farms of the same class (table 5). So-called "abnormal" farms (2,178 were counted in the 1964 census) were excluded.

Size of farm made little difference in whether or not farmers used pesticides. Survey results revealed that about 94 percent of all farmers, regardless of the extent of their farming operations, used pesticides.^{5/} Inasmuch as pests are a universal problem and pesticides are so widely used, the amount spent by farmers was almost directly related to the size

^{5/} Agr. Econ. Rpt. No. 106.

Table 5.--Economic classes of farms based on gross sales of agricultural products, 48 contiguous States, 1964

Census class of farm	Value of farm products sold	Farms in each class	Percentage of farms in each class
	<u>Dollars</u>	<u>Number</u>	<u>Percent</u>
I-----	40,000 or more	141,914	4
II-----	20,000-39,999	259,898	8
III-----	10,000-19,999	467,096	15
IV-----	5,000- 9,999	504,614	16
V and VI-----	Up to 4,999	1,782,157	57
Total-----		3,155,679	100

of operation. Farmers with the largest gross volume of sales expended an average of \$1,378 per farm for pesticides. Operators of farms with the lowest sales volume averaged \$30 per farm.

By size classes, farmers with the highest gross volume of sales--\$40,000 and over per year--spent \$193 million for pesticide materials (table 6). Thus, 4 percent of all farms accounted for 40 percent of pesticide expenditures. Farmers with gross sales of \$20,000 and over--12 out of every 100--spent 61 percent of the total outlay for farm pesticides in 1964.

On the whole, operators of larger farms tended to spend more for pesticides per acre treated than did operators of smaller farms (table 7). However, the 1964 survey also showed that expenditures for pesticides per acre were relatively high on the smallest farms. Costs per acre tended to be lowest on intermediate-size farms--farms with sales volumes ranging from \$10,000 to \$40,000 per year.

One explanation of these relationships among different size classes of farmers insofar as pesticide expenditures are concerned has to do with external economies of scale. It may be that small farmers apply given quantities of pesticides per acre at a relatively high cost per unit purchased. Intermediate-size farmers may apply a minimum amount of pesticides per acre, but because their total purchase is relatively great, unit costs per acre treated tend to be lower than for other size classes of farmers. Finally, operators of farms with the highest volume of sales may apply more pesticides per acre than do intermediate-size farmers but at a similar cost per unit of pesticides bought.

Livestock Pesticides

Pesticides to treat livestock and their immediate environment cost farmers the equivalent of about 6 1/2 cents of each dollar spent for all pesticides used in 1964. Altogether, externally applied pesticides for livestock cost an estimated \$31.3 million--6.5 percent of the \$479 million

Table 6.--Total pesticide expenditures distributed by gross sales of agricultural products, farm production regions, 48 contiguous States, 1964 ^{1/}

Region	Farmers with gross annual sales of--						All farms
	Up to	\$5,000-	\$10,000-	\$20,000-	\$40,000-		
	\$4,999	\$9,999	\$19,999	\$39,999	and over		
	1,000	1,000	1,000	1,000	1,000	1,000	
	dollars	dollars	dollars	dollars	dollars	dollars	dollars
Northeast-----	3,650	2,986	5,608	8,096	12,841	33,181	
Lake States-----	4,707	3,827	8,229	7,315	9,787	33,865	
Corn Belt-----	3,966	5,878	14,447	20,326	26,204	70,821	
Northern Plains-----	2,381	3,295	6,358	5,634	3,593	21,261	
Appalachian-----	7,921	8,905	12,373	10,458	12,114	51,771	
Southeast-----	8,314	8,054	11,302	13,705	23,577	64,952	
Delta States-----	7,673	7,121	5,466	7,372	22,517	50,149	
Southern Plains-----	7,758	6,963	7,524	8,365	16,123	46,733	
Mountain-----	2,927	1,881	3,188	4,782	13,353	26,131	
Pacific-----	4,168	5,050	5,932	12,585	52,423	80,158	
United States-----	53,465	53,960	80,427	98,638	192,532	479,022	
Percentage of U.S. total-----	Percent	Percent	Percent	Percent	Percent	Percent	
	11	11	17	21	40	100	

^{1/} Excludes pesticides used for treating seeds, stored crops, or storage buildings.

Table 7.--Pesticide expenditures per acre by farmers in selected agricultural sales groups, by crop, 48 contiguous States, 1964 ^{1/}

Crop	Farmers with gross annual sales of--						
	\$2,500-	\$5,000-	\$10,000-	\$20,000-	\$40,000-	\$100,000-	\$500,000
	\$4,999 ^{2/}	\$9,999	\$19,999	\$39,999	\$99,999	\$499,999	and over
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Cotton-----	13.42	10.23	8.33	10.35	10.58	15.83	11.49
Corn-----	2.36	1.60	1.56	1.84	2.44	2.39	1.42
Wheat-----	.72	.49	.48	.56	.72	.59	---
Sorghum-----	1.75	.62	.63	.59	.71	1.16	---
Other grains ^{3/} -----	1.21	.69	.87	1.35	2.82	4.64	1.78
Tobacco-----	22.07	26.29	33.49	38.99	28.79	37.96	---
Soybeans-----	1.52	2.19	2.61	2.79	2.30	2.14	2.02
Other field crops ^{3/} -----	8.93	3.60	3.66	4.65	5.12	8.33	2.42
Alfalfa-----	5.27	2.94	1.70	2.04	1.92	1.05	4.17
Other hay and forage-----	1.13	1.01	.86	1.56	.76	.14	.61
Irish potatoes-----	10.39	6.66	7.75	10.64	8.71	16.93	10.97
Other vegetables ^{3/} -----	6.18	5.86	9.20	10.34	15.49	17.52	9.85
Citrus-----	6.11	18.80	9.69	14.44	15.49	8.01	---
Apples-----	51.15	43.25	39.33	51.15	44.00	62.66	88.78
Other deciduous fruit ^{3/} -----	4.14	18.46	16.33	20.03	17.31	34.46	49.18
Other fruits, nuts, berries, nursery, and ornamentals ^{3/} -----	31.03	7.74	6.06	9.99	13.56	8.28	6.06
Summer fallow-----	---	.83	.88	.67	.48	---	---
All crops-----	10.38	3.29	2.52	3.16	4.28	7.61	14.72

^{1/} Excludes pesticides used for treating seeds, stored crops, or storage buildings.

^{2/} Appalachian, Southeast, and Delta States only.

^{3/} Crops included in this category are listed in appendix table 27.

that commercial farmers spent for all pesticides (table 8). Livestock included in the survey--dairy and beef cattle, sheep, hogs, and poultry--were treated on farms that accounted for nearly three-fourths of all sales of livestock and livestock products in the 48 States. On January 1, 1964, the inventory value of all farm livestock, excluding broilers, was \$15.7 billion. Based on this amount, costs of pesticides used during the year were equivalent to 1/5 of 1 percent of the value of all livestock.

Livestock pesticides are employed chiefly to control vermin, while elimination of pests in crops is almost entirely for economic reasons, such as to increase yields. Pest control in livestock is conducted for economic reasons, too. But reducing or eliminating hazards to human health are the important criteria for some types of controls. For example, fly populations are kept at a minimum in dairy operations mainly to protect the health of consumers.

Ranchers, feedlot operators, and farmers spent more for pesticides used on beef cattle than for any other class of farm animals. In 1964, about half of all livestock pesticide expenditures--\$17.7 million--were for beef animals. Range animals may require relatively large quantities of pesticides for a variety of purposes. Some pests limit weight gains, others damage hides, while still others cause death. Cost of pesticides used to treat all classes of cattle in 1964 totaled \$26.7 million. Pesticides for cattle and hogs represented 94 percent of the value of all livestock pesticides used.

Expenditures by Regions

Costs of pesticides for dairy cattle were greatest in the Northeast, Lake States, and Corn Belt. These regions, which accommodate the major fraction of the Nation's dairy herd, accounted for 75 percent of the costs of pesticides applied to dairy cattle.

Table 8.--Pesticide expenditures for all livestock distributed by type of livestock and by region, 48 contiguous States, 1964 ^{1/}

Region	Cattle		Sheep	Hogs	Poultry	Total
	Dairy	Beef				
	1,000	1,000	1,000	1,000	1,000	1,000
	dollars	dollars	dollars	dollars	dollars	dollars
Northeast-----	1,782	256	2	41	422	2,503
Lake States-----	2,814	419	24	213	162	3,632
Corn Belt-----	2,178	2,750	111	1,782	285	7,106
Northern Plains-----	585	1,718	37	136	178	2,654
Appalachian-----	454	1,083	11	262	77	1,887
Southeast-----	124	589	---	44	113	870
Delta States-----	145	909	4	4	130	1,192
Southern Plains-----	313	5,241	6	214	78	5,852
Mountain-----	308	4,047	66	17	29	4,467
Pacific-----	294	669	14	13	140	1,130
All regions-----	8,997	17,681	275	2,726	1,614	31,293

^{1/} Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

In the Southern Plains and Mountain regions, where beef cattle production is concentrated, costs of pesticides for cattle in 1964 amounted to \$9.3 million--30 percent of the total cost of all pesticides used for livestock.

Farmers and ranchers in the Corn Belt, Southern Plains, and Mountain regions reported using pesticides valued at \$17.4 million for livestock treatment. This was well over half the cost of all materials used in the 48 contiguous States during 1964.

At the national level, 72 percent of all commercial farms and ranches with livestock reported using pesticides to treat animals at least once during the year (table 9). The incidence of such usage tended to be greatest in the Northeast and Lake States where dairying is largely concentrated. In contrast, scarcely more than a third of the farmers with livestock in the Southeast were users of livestock pesticides in 1964.

With the single exception of the Pacific region, dairy farmers were the greatest users of livestock pesticides. The proportion of dairymen using pesticides to treat their herds varied within a relatively narrow range from 75 to 89 percent in eight of the 10 farming regions of the conterminous United States (table 10).

Expenditures by Form of Application

Pesticides usually are applied to animals or their surroundings in the form that will produce the most kill for the least cost consistent with safety. Sprays are generally preferred by most users over pesticides in dry form. Sprays can be readily diluted to working strength and easily applied, and their physical condition at the time of application is a known factor. Powders, on the other hand, are more difficult to dilute to proper strength under farm conditions, the technical chemical may tend to segregate due to differences in particle size, and the physical condition of the product is more difficult to maintain at optimum levels. Spray materials used in 1964 were valued at approximately \$20.7 million and dry materials at \$5.6 million. Such diverse methods of application as aerosols, rubbing devices, gases, strips, dips, paints, and smears accounted for an additional \$5 million.

More information on regional expenditures for pesticides based on form of application to the various classes of livestock is shown in appendix tables 22-26.

Pesticides For Other Uses

Rodents are among man's greatest enemies. They destroy uncounted millions of dollars' worth of foodstuffs each year; they help spread diseases throughout the world; they cause serious structural damage to property; and they will even attack and kill humans. A mouse eats the equivalent of its weight about every 10 days. A pair of rats can eat or destroy the equivalent of 100 pounds of grain a year. Most farmers and many gardeners know what a rabbit can do to a lettuce or cabbage patch.

Costs of materials in 1964 for rodent control on all commercial farms was \$7 million. Nearly 25 percent of this amount was used in just one region--the Corn Belt (table 11). In seven of the 10 farming regions, baits accounted for more than 90 percent of the total cost of rodenticides.

Table 9.--Extent and costs of pesticides used for all major classes of livestock and distribution by form of application, by region, 48 contiguous States, 1964 1/

Region	Percentage of farms reporting pesticide use <u>2/</u>	Expenditures			
		Total	Distributed by form of application		
			Dry	Spray	Other
		1,000 dollars	Percent	Percent	Percent
Northeast-----	83	2,503	10	78	12
Lake States-----	85	3,632	10	85	6
Corn Belt-----	78	7,106	31	60	9
Northern Plains-----	77	2,654	7	62	31
Appalachian-----	58	1,887	39	55	6
Southeast-----	37	870	24	72	5
Delta States-----	62	1,192	38	53	10
Southern Plains-----	68	5,852	13	67	20
Mountain-----	65	4,467	4	64	33
Pacific-----	65	1,130	19	64	17
All livestock-----	72	31,293	18	66	16

1/ Includes pesticides used for treating dairy and beef cattle, sheep, hogs, and poultry, and the buildings in which they are housed. Does not include disinfectants or any kind of medicine taken internally.

2/ Farms using pesticides on any livestock or poultry as a percentage of farms having any livestock or poultry.

Table 10.--Percentage of farms reporting treatment of livestock with pesticides, by class of livestock and by region, 48 contiguous States, 1964 1/2/

Region	Cattle		Sheep	Hogs	Poultry	All
	Dairy	Beef				
	Percent	Percent				
Northeast-----	87	24	20	29	25	83
Lake States-----	89	18	18	43	28	85
Corn Belt-----	81	46	19	63	35	78
Northern Plains-----	67	48	17	55	34	77
Appalachian-----	77	42	11	28	11	58
Southeast-----	77	38	---	28	15	37
Delta States-----	82	58	13	32	17	62
Southern Plains-----	82	64	8	41	22	68
Mountain-----	75	52	17	28	25	65
Pacific-----	64	51	29	69	36	65
All regions-----	82	46	17	50	26	72

1/ Farms using pesticides on specified kind of livestock or poultry as a percentage of farms having that kind of livestock or poultry.

2/ Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

Table 11.--Expenditures for pesticides for rodent control and distribution
by form of application, by region, 48 contiguous States, 1964 1/

Region	Total expenditures	Form of application		
		Bait	Spray	Other
	1,000			
	<u>dollars</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Northeast-----	727	93	3	4
Lake States-----	863	98	1	1
Corn Belt-----	1,790	98	1	1
Northern Plains-----	914	91	2	7
Appalachian-----	637	97	1	2
Southeast-----	305	95	3	2
Delta States-----	557	97	1	2
Southern Plains-----	497	86	7	7
Mountain-----	250	84	8	8
Pacific-----	768	81	8	11
All regions-----	7,308	92	3	5

1/ Rodents were defined in the survey questionnaire as ". . . rats, rabbits, gophers, and other rodents."

APPENDIX

Table 12.--Extent and costs of pesticides used on specified crops, all farms, Northeast States, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Corn-----	64	67	5,385	2.82
Other grains <u>3/</u> -----	21	27	646	1.16
Tobacco-----	83	80	1,622	26.41
Soybeans-----	22	32	372	2.49
Other field crops <u>3/</u> -----	21	35	187	2.73
Alfalfa-----	20	16	891	2.29
Other hay and pasture <u>3/</u> -----	1	4/	24	1.21
Irish potatoes-----	94	99	3,818	13.36
Other vegetables <u>3/</u> -----	77	95	5,424	11.05
Apples-----	86	99	9,917	45.20
Other deciduous fruit <u>3/</u> -----	97	92	1,329	22.24
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	88	93	205	8.20
Total-----	65	22	29,820	7.65

1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.2/ Farms using pesticides on specified crops as a percentage of farms growing crop.3/ Crops included in this category are listed in appendix table 27.4/ Less than 0.5 percent.Table 13.--Extent and costs of pesticides used on specified crops, all farms, Lake States, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Corn-----	62	59	13,062	2.16
Wheat-----	20	35	331	.47
Sorghum-----	14	10	5	1.15
Other grains <u>3/</u> -----	25	30	950	.45
Tobacco-----	31	32	4	1.22
Soybeans-----	13	8	1,209	4.39
Other field crops <u>3/</u> -----	49	41	1,570	2.42
Alfalfa-----	1	4/	31	1.08
Other hay and pasture <u>3/</u> -----	7	2	165	.90
Irish potatoes-----	87	86	1,901	11.84
Other vegetables <u>3/</u> -----	53	59	1,862	6.13
Apples-----	100	99	4,935	50.26
Other deciduous fruits <u>3/</u> -----	100	97	1,734	23.40
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	92	96	313	6.65
Summer fallow-----	67	51	32	5.88
Total-----	70	26	28,104	3.50

1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.2/ Farms using pesticides on specified crops as a percentage of farms growing crop.3/ Crops included in this category are listed in appendix table 27.4/ Less than 0.5 percent.

Table 14.--Extent and costs of pesticides used on specified crops, all farms,
Corn Belt States, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	60	53	1,215	6.36
Corn-----	76	71	36,863	1.67
Wheat-----	6	10	611	.93
Sorghum-----	18	29	139	1.17
Other grains <u>3/</u> -----	6	5	207	.58
Tobacco-----	75	68	128	7.97
Soybeans-----	21	19	10,076	3.03
Other field crops <u>3/</u> -----	23	33	1,160	3.11
Alfalfa-----	3	2	157	1.47
Other hay and pasture <u>3/</u> -----	8	3	790	.89
Irish potatoes-----	100	100	468	16.62
Other vegetables <u>3/</u> -----	74	79	2,179	11.07
Apples-----	91	99	4,213	67.93
Other deciduous fruits <u>3/</u> -----	100	100	602	39.80
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	100	100	26	.98
Total-----	79	32	58,834	2.32

- 1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.
2/ Farm using pesticides on specified crops as a percentage of farms growing crop.
3/ Crops included in this category are listed in appendix table 27.

Table 15.--Extent and costs of pesticides used on specified crops, all farms,
Northern Plains, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Corn-----	52	47	8,594	1.77
Wheat-----	34	32	2,549	.35
Sorghum-----	39	31	1,142	.52
Other grains <u>3/</u> -----	28	33	1,229	.34
Soybeans-----	9	6	277	2.99
Other field crops <u>3/</u> -----	31	29	896	1.05
Alfalfa-----	2	1	47	.67
Other hay and pasture <u>3/</u> -----	10	1	926	.69
Irish potatoes-----	100	100	297	2.66
Summer fallow-----	13	3	388	.67
Total-----	71	14	16,345	.80

- 1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.
2/ Farms using pesticides on specified crops as a percentage of farms growing crop.
3/ Crops included in this category are listed in appendix table 27.

Table 16.--Extent and costs of pesticides used on specified crops, all farms, Appalachian States, 1964 ^{1/}

Crops treated	Percentage of farms reporting pesticide use ^{2/}	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	70	86	5,065	6.37
Corn-----	30	48	5,836	2.76
Wheat-----	11	33	315	1.01
Sorghum-----	34	63	130	1.36
Other grains ^{3/} -----	2	6	116	1.27
Tobacco-----	94	94	22,304	29.42
Soybeans-----	12	23	584	1.16
Other field crops ^{3/} -----	64	71	3,537	10.01
Alfalfa-----	35	36	1,527	4.70
Other hay and pasture ^{3/} -----	3	1	367	1.33
Irish potatoes-----	50	56	170	6.95
Other vegetables ^{3/} -----	44	65	460	4.06
Apples-----	67	98	7,929	66.21
Other deciduous fruits ^{3/} -----	80	95	30	17.08
Other fruits, nuts, nursery, and ornamentals ^{3/} -----	62	57	80	9.93
Total-----	89	23	48,450	7.00

^{1/} Excludes pesticides used for treating seeds, stored crops, or storage buildings.

^{2/} Farms using pesticides on specified crops as a percentage of farms growing crop.

^{3/} Crops included in this category are listed in appendix table 27.

Table 17.--Extent and costs of pesticides used on specified crops, all farms, Southeast States, 1964 ^{1/}

Crops treated	Percentage of farms reporting pesticide use ^{2/}	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	87	93	26,404	13.75
Corn-----	18	13	1,017	2.07
Wheat-----	4	7	16	.82
Sorghum-----	33	67	121	1.44
Other grains ^{3/} -----	2	3	76	2.65
Tobacco-----	100	100	5,967	38.91
Soybeans-----	22	43	1,367	2.70
Other field crops ^{3/} -----	70	80	6,937	6.87
Hay and pasture ^{3/} -----	5	4	546	1.07
Irish potatoes-----	100	100	461	8.87
Other vegetables ^{3/} -----	59	79	6,387	16.34
Citrus-----	100	79	10,381	12.82
Deciduous fruits ^{3/} -----	100	97	2,987	8.36
Other fruits, nuts, nursery, and ornamentals ^{3/} -----	50	47	422	21.68
Total-----	77	29	63,089	10.51

^{1/} Excludes pesticides used for treating seeds, stored crops, or storage buildings.

^{2/} Farms using pesticides on specified crops as a percentage of farms growing crop.

^{3/} Crops included in this category are listed in appendix table 27.

Table 18.--Extent and costs of pesticides used on specified crops, all farms,
Delta States, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	83	80	37,344	14.09
Corn-----	16	26	276	.97
Wheat-----	31	52	365	.91
Other grains <u>3/</u> -----	41	45	4,289	6.85
Soybeans-----	43	47	4,463	1.85
Other field crops <u>3/</u> -----	13	12	18	.37
Alfalfa-----	9	4	4	1.20
Other hay and pasture <u>3/</u> -----	5	4	539	.99
Vegetables <u>3/</u> -----	62	72	254	3.88
Apples-----	100	100	133	29.42
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	50	60	292	3.07
Total-----	68	35	47,977	6.75

1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.

2/ Farms using pesticides on specified crops as a percentage of farms growing crop.

3/ Crops included in this category are listed in appendix table 27.

Table 19.--Extent and costs of pesticides used on specified crops, all farms,
Southern Plains, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	50	45	22,536	7.35
Corn-----	5	5	53	1.20
Wheat-----	8	3	140	.52
Sorghum-----	13	12	726	.80
Other grains <u>3/</u> -----	13	32	10,250	7.67
Soybeans-----	4	2	4	1.20
Other field crops <u>3/</u> -----	11	9	162	1.92
Alfalfa-----	25	30	252	1.19
Other hay and pasture <u>3/</u> -----	10	3	2,962	.79
Vegetables <u>3/</u> -----	50	32	1,798	16.86
Citrus-----	100	100	326	12.96
Deciduous fruits <u>3/</u> -----	100	100	253	5.11
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	83	90	230	2.15
Total-----	46	7	39,692	4.13

1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.

2/ Farms using pesticides on specified crops as a percentage of farms growing crop.

3/ Crops included in this category are listed in appendix table 27.

Table 20.--Extent and costs of pesticides used on specified crops, all farms, Mountain States, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	35	77	5,289	11.81
Corn-----	58	51	548	1.54
Wheat-----	50	47	2,703	.64
Sorghum-----	17	19	416	1.84
Other grains <u>3/</u> -----	31	32	938	.70
Other field crops <u>3/</u> -----	35	21	2,030	6.73
Alfalfa-----	17	14	1,066	1.81
Other hay and pasture <u>3/</u> -----	9	4/	81	1.45
Irish potatoes-----	81	65	438	2.25
Other vegetables <u>3/</u> -----	69	76	1,962	14.91
Apples-----	85	98	1,192	30.41
Other deciduous fruits <u>3/</u> -----	85	98	279	8.25
Summer fallow-----	10	1	89	.88
Total-----	54	1	17,031	2.57

- 1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.
2/ Farms using pesticides on specified crops as a percentage of farms growing crop.
3/ Crops included in this category are listed in appendix table 27.
4/ Less than 0.5 percent.

Table 21.--Extent and costs of pesticides used on specified crops, all farms, Pacific States, 1964 1/

Crops treated	Percentage of farms reporting pesticide use <u>2/</u>	Percentage of acres treated with pesticides	Expenditures for pesticides	
			Total	Per acre treated
	Percent	Percent	1,000 dollars	Dollars
Cotton-----	97	98	16,187	21.80
Corn-----	21	20	169	2.78
Wheat-----	78	87	2,457	.83
Sorghum-----	6	2	3	.63
Other grains <u>3/</u> -----	36	36	1,095	.80
Other field crops <u>3/</u> -----	71	52	3,550	4.84
Alfalfa-----	4	2	48	1.28
Other hay and pasture <u>3/</u> -----	8	4/	110	.97
Irish potatoes-----	77	96	3,138	21.23
Other vegetables <u>3/</u> -----	91	90	13,042	16.51
Citrus-----	93	97	3,078	12.66
Apples-----	98	88	10,649	61.52
Other deciduous fruits <u>3/</u> -----	93	97	7,396	24.77
Other fruits, nuts, nursery, and ornamentals <u>3/</u> -----	83	83	10,529	12.65
Summer fallow-----	30	4	2,868	17.22
Total-----	70	13	74,319	9.20

- 1/ Excludes pesticides used for treating seeds, stored crops, or storage buildings.
2/ Farms using pesticides on specified crops as a percentage of farms growing crop.
3/ Crops included in this category are listed in appendix table 27.
4/ Less than 0.5 percent.

Table 22.--Extent and costs of pesticides used for dairy cattle and distribution by form of application, by region, 48 contiguous States, 1964 1/

Region	Percentage of farms reporting pesticide use <u>2/</u>	Expenditures			
		Total	Distributed by form of application		
			Dry	Spray	Other
	Percent	1,000 dollars	Percent	Percent	Percent
Northeast-----	87	1,782	12	75	13
Lake States-----	89	2,814	7	89	4
Corn Belt-----	81	2,178	8	83	9
Northern Plains-----	67	585	14	68	18
Appalachian-----	77	454	49	42	9
Southeast-----	77	124	38	42	20
Delta States-----	82	145	63	25	12
Southern Plains-----	82	313	53	42	5
Mountain-----	75	308	26	66	8
Pacific-----	64	294	49	43	8
All regions-----	82	8,997	16	75	9

1/ Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

2/ Farms using pesticides on dairy cattle as a percentage of farms with dairy cattle.

Table 23.--Extent and costs of pesticides used for beef cattle and distribution by form of application, by region, 48 contiguous States, 1964 1/

Region	Percentage of farms reporting pesticide use <u>2/</u>	Expenditures			
		Total	Distributed by form of application		
			Dry	Spray	Other
	Percent	1,000 dollars	Percent	Percent	Percent
Northeast-----	24	256	22	14	64
Lake States-----	18	419	14	43	43
Corn Belt-----	46	2,750	2	42	56
Northern Plains-----	48	1,718	3	55	42
Appalachian-----	42	1,083	34	53	13
Southeast-----	38	589	16	75	9
Delta States-----	58	909	14	72	14
Southern Plains-----	64	5,241	9	87	4
Mountain-----	52	4,047	2	63	35
Pacific-----	51	669	2	67	31
All regions-----	46	17,681	8	65	27

1/ Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

2/ Farms using pesticides on beef cattle as a percentage of farms with beef cattle.

Table 24.--Extent and costs of pesticides used for sheep and distribution by form of application, by region, 48 contiguous States, 1964 ^{1/}

Region	Percentage of farms reporting pesticide use ^{2/}	Expenditures			
		Total	Distributed by form of application		
			Dry	Spray	Other
	Percent	1,000 dollars	Percent	Percent	Percent
Northeast-----	20	2	53	---	47
Lake States-----	18	24	23	16	61
Corn Belt-----	19	111	2	23	75
Northern Plains-----	17	37	17	43	40
Appalachian-----	11	11	1	28	71
Southeast-----	---	---	---	---	---
Delta States-----	13	4	---	25	75
Southern Plains-----	8	6	2	98	---
Mountain-----	17	66	5	47	48
Pacific-----	29	14	39	15	46
All regions-----	17	275	8	32	60

^{1/} Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

^{2/} Farms reporting pesticide use on sheep as a percentage of farms with sheep.

Table 25.--Extent and costs of pesticides used for hogs and distribution by form of application, by region, 48 contiguous States, 1964 ^{1/}

Region	Percentage of farms reporting pesticide use ^{2/}	Expenditures			
		Total	Distributed by form of application		
			Dry	Spray	Other
	Percent	1,000 dollars	Percent	Percent	Percent
Northeast-----	29	41	2	98	3/
Lake States-----	43	213	12	85	3
Corn Belt-----	63	1,782	38	60	2
Northern Plains-----	55	136	9	70	21
Appalachian-----	28	262	40	60	3/
Southeast-----	28	44	12	88	3/
Delta States-----	32	4	37	53	10
Southern Plains-----	41	214	4	18	78
Mountain-----	28	17	2	87	11
Pacific-----	69	13	39	61	---
All regions-----	50	2,726	31	60	9

^{1/} Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

^{2/} Farms reporting pesticide use on hogs as a percentage of farms with hogs.

^{3/} Less than 0.5 percent.

Table 26.--Extent and costs of pesticides used for poultry and distribution by form of application, by region, 48 contiguous States, 1964 ^{1/}

Region	Percentage of farms reporting pesticide use ^{2/}	Expenditures			
		Total	Distributed by form of application		
			Dry	Spray	Other
	Percent	1,000 dollars	Percent	Percent	Percent
Northeast-----	25	422	5	93	2
Lake States-----	28	162	13	79	8
Corn Belt-----	35	285	25	60	15
Northern Plains-----	34	178	12	63	25
Appalachian-----	11	77	28	72	3/
Southeast-----	15	113	35	65	3/
Delta States-----	17	130	52	47	1
Southern Plains-----	22	78	56	28	16
Mountain-----	25	29	2	75	23
Pacific-----	36	140	2	98	3/
All regions-----	26	1,614	19	73	8

^{1/} Includes pesticides used for treating livestock and poultry buildings. Does not include disinfectants or any kind of medicine taken internally.

^{2/} Farms reporting pesticide use on poultry as a percentage of farms with poultry.

^{3/} Less than 0.5 percent.

Table 27.--Crops included in grouped categories

<u>Other Deciduous Fruit</u>	<u>Other Hay and Pasture</u>	<u>Other Field Crops</u>
Peaches	All hay, other than	Grass and hay seed
Pears	alfalfa	Buckwheat
Cherries	All pasture and	Castorbeans
Apricots	rangeland	Hops
Plums		Lentils
Prunes		Millet
Nectarines		Mung beans
	<u>Other Vegetables</u>	Peppermint
	Sweetpotatoes	Spearmint
<u>Other Fruits and Nuts</u>	Cabbage	Rutabagas
Grapes	Carrots	Sesame
Avocados	Celery	Spelt
Figs	Lettuce	Sunflowers
Blackberries	Onions	Velvetbean
Blueberries	Tomatoes	Dry beans
Boysenberries	Watermelons	Dry field peas
Currants	Sweet corn	Peanuts
Gooseberries	Snap beans	Sugarbeets
Loganberries	Spinach	Safflower
Raspberries	Artichokes	Flax
Strawberries	Asparagus	Popcorn
Almonds	Broccoli	Broomcorn
Filberts	Cauliflower	Cowpeas
Pecans	Cucumbers	Sugarcane
Walnuts	Beets	
Olives	Green peppers	
Tung nuts	Green peas	
	Cranberries	
<u>Other Grains</u>	Other vegetables	
Oats		
Mixed grains		
Barley		
Rye		
Rice		